

CHAPTER 8: COMMUNICABLE DISEASES

The importance of communicable (infectious) diseases as a cause of morbidity and mortality in the U.S. declined dramatically since the beginning of this century with the establishment of sanitary water supplies and sewage systems, and with the advent of the antibiotic era. However, the past two decades have seen the emergence of new infectious diseases and the re-emergence of infections that were thought to be declining. Although HIV/AIDS is notable among the newly emerged infectious diseases, a host

of other infectious diseases have been discovered since 1970, such as campylobacteriosis, E. coli O157:H7, and hepatitis C. Tuberculosis, particularly multi-drug resistant tuberculosis has gained attention in recent years as an important re-emerging pathogen, however antimicrobial-resistant strains of other pathogens are also emerging, such as methicillin-resistant Staphylococcal aureus and vancomycin-resistant enterococcus. These pathogens mainly cause illness for hospitalized or institutionalized persons.

**Table 8-1:
Summary of Communicable Disease Incidence or Death, 1996***

| Disease | King County | | Seattle | | WA State | | U.S.** | |
|---|-------------|--------|---------|--------|----------|--------|--------|---------|
| | Rate | Number | Rate | Number | Rate | Number | Rate | Number |
| AIDS, Age-Adj. Death Rate | 12.2 | 238 | 29.0 | 189 | 6.6 | 400 | 11.6 | 32,655 |
| STDs: | | | | | | | | |
| Chlamydia (female) | 286.5 | 2,352 | 363.0 | 985 | 259.5 | 7,195 | 314.9 | 423,349 |
| Gonorrhea | 56.8 | 925 | 104.0 | 556 | 36.6 | 2,020 | 124.0 | 325,883 |
| Syphilis (pri. + sec.) | --- | <5 | 0.0 | 0 | 0.2 | 9 | 4.3 | 11,387 |
| Tuberculosis | 7.9 | 128 | | | 5.2 | 285 | 8.1 | 21,337 |
| Hepatitis A | 26.3 | 429 | 35.7 | 191 | 18.1 | 1,001 | 11.8 | 31,032 |
| Hepatitis B | 4.9 | 80 | 8.4 | 45 | 2.9 | 158 | 4.0 | 10,637 |
| Hepatitis C | 0.7 | 11 | --- | <5 | 1.2 | 66 | 1.4 | 3,716 |
| Vaccine Preventable: | | | | | | | | |
| HIB | 0.3 | 5 | --- | <5 | 0.2 | 10 | 0.4 | 1,170 |
| Measles | 0.0 | 0 | 0.0 | 0 | | | 0.2 | 508 |
| Pertussis | 16.1 | 263 | 13.7 | 73 | 15.0 | 830 | 3.0 | 7,796 |
| Pneumonia/Influenza, Age-Adj. Death Rate | 12.1 | 470 | 11.4 | 204 | 12.3 | 1,650 | 12.9 | 82,923 |
| Enteric Diseases: | | | | | | | | |
| Campylobacteriosis | 20.9 | 340 | 26.0 | 139 | 20.6 | 1,139 | | |
| E. Coli O157:H7 | 3.6 | 59 | 4.5 | 24 | 3.4 | 187 | 1.0 | 2,741 |
| Giardiasis | 15.2 | 247 | 19.8 | 106 | 12.1 | 668 | | |
| Salmonellosis | 13.7 | 223 | 14.4 | 77 | 13.3 | 734 | 17.3 | 45,471 |
| Shigellosis | 4.3 | 70 | 7.9 | 42 | 6.0 | 333 | 9.9 | 25,978 |

* If not specified, rates are reported per 100,000 population (crude rates). Pneumonia and influenza incidence data are not available.

** CDC. Summary of Notifiable Diseases 1996. MMWR. October 31, 1997. 45 (53).

Source: Death Cert. Data: WA State Dept. of Health, Center for Health Statistics; STD and Tuberculosis Report Records: WA State Dept. of Health, STD/TB Services; Hepatitis, Vaccine-Preventable, and Enteric Disease Report Records: Seattle-King Co. Dept. of Health, Prev. Services Division.

In this chapter, we examine the occurrence of communicable diseases as measured by reports from health care providers, who are required by state law to report certain communicable diseases to local health departments, where the report can be useful in preventing the spread of infections to others (see Appendix III for a list of reportable diseases). The sensitivity of this

surveillance is not uniform across diseases: for instance, no polio or rabies cases go unreported, but probably only about half of the cases of gonorrhea are reported and perhaps only 5% of the cases of salmonellosis. Table 8-1 summarizes the 1996 incidence (new cases) of the communicable diseases discussed in this chapter, as well as death for AIDS and pneumonia/influenza.

HIV/AIDS

AIDS is caused by the human immunodeficiency virus (HIV). HIV infects and destroys key cells in the human immune system making a person susceptible to a wide range of opportunistic infections and certain cancers that are rare in persons with normal immune function. HIV establishes a life-long infection which can be transmitted to other persons in three primary ways: 1) sexual contact including vaginal, anal and oral intercourse; 2) blood contact through injection drug use with sharing of injection equipment; 3) from an HIV-infected mother to her newborn before or during birth or sometimes through breast feeding. Transmission through blood transfusion or receipt of other blood products or tissues for transplantation has essentially been eliminated in the United States and other developed countries by screening and rigorous testing of donors since 1985. Rare instances of transmission have occurred to medical personnel with occupational exposure to blood.

After initial infection, HIV generally causes no symptoms for many years although a person remains infectious to other people during this time. Up until 1996, the average time between HIV infection and the onset of AIDS was approximately 10 to 12 years and the average time to death after the onset of AIDS

was about 2 to 4 years. However, the recent development of highly-active antiretroviral drug therapies has extended the period an HIV-infected person may remain healthy and treatment of HIV positive women during pregnancy and at delivery (and of their newborn after delivery) has substantially reduced the rate of maternal/child HIV transmission. The availability of effective treatment to forestall AIDS-related illness and death and reduce perinatal transmission increases the value of early detection of HIV infection and establishment of medical care.

Since the early 1980s, AIDS has been the fastest growing cause of death and a serious threat to public health. This is especially true in younger age groups—about three-quarters of all deaths due to AIDS in King County are in people 25-44 years of age, and among men in this age group, AIDS has been a leading cause of death since 1989. In 1996, deaths due to AIDS in King County decreased for the first time, and new cases have shown declines since 1994. The net effect of these changes, however, is that more residents are living with AIDS and HIV and in need of medical care and services. Even as these encouraging changes in overall case numbers and deaths occur, HIV cases among women, African Americans, and persons of Hispanic origin continue to increase.

Figure 8-1:
AIDS, Number of New Cases and Deaths
King County, 1987-1996

- ◆ From the first case in 1982 through 1996, 5,397 cases of AIDS in King County residents had been reported and 3,310 (61%) have died.
- ◆ The number of new AIDS cases diagnosed in King County peaked in 1993 (647 cases) and has declined since then to 384 cases reported for 1996. Deaths continued to rise each year through 1995, then declined by nearly 40% in 1996 when 238 deaths were recorded (Figure 8-1).

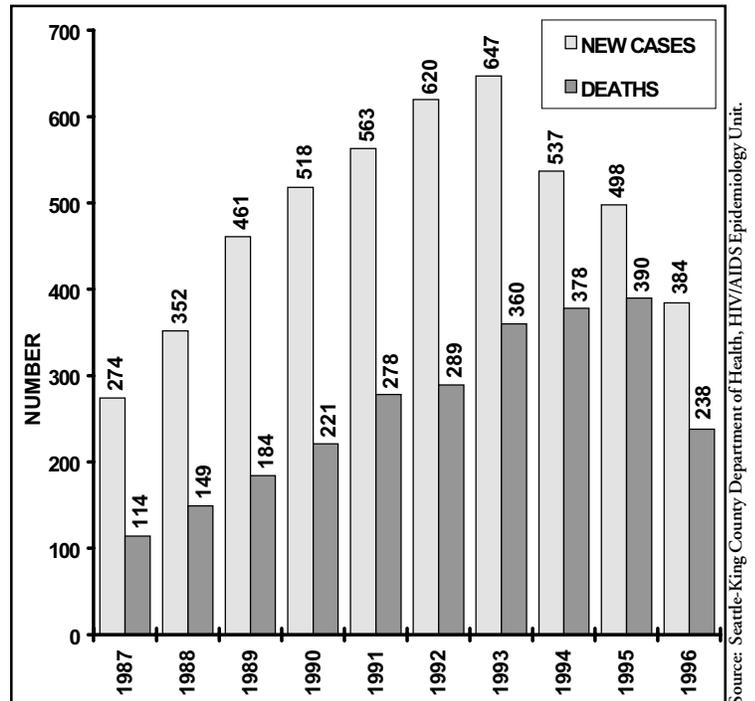
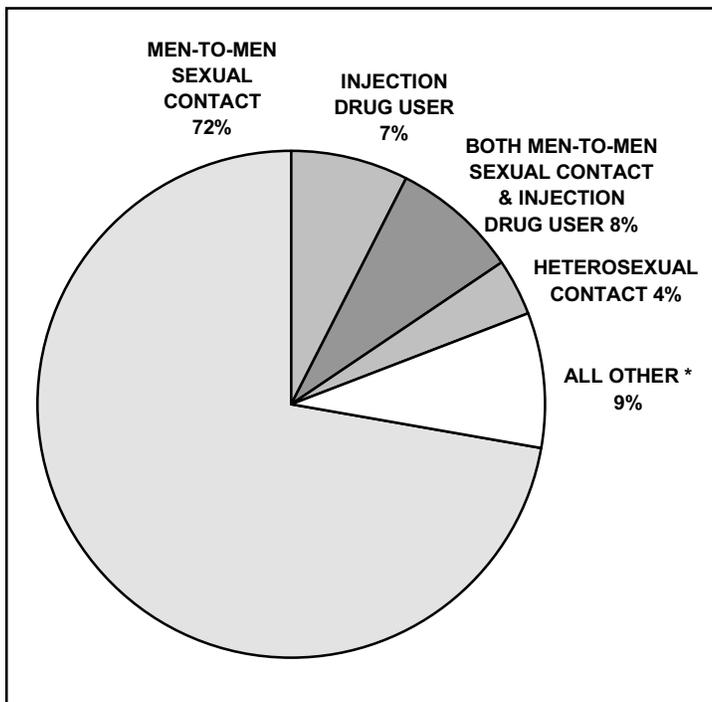


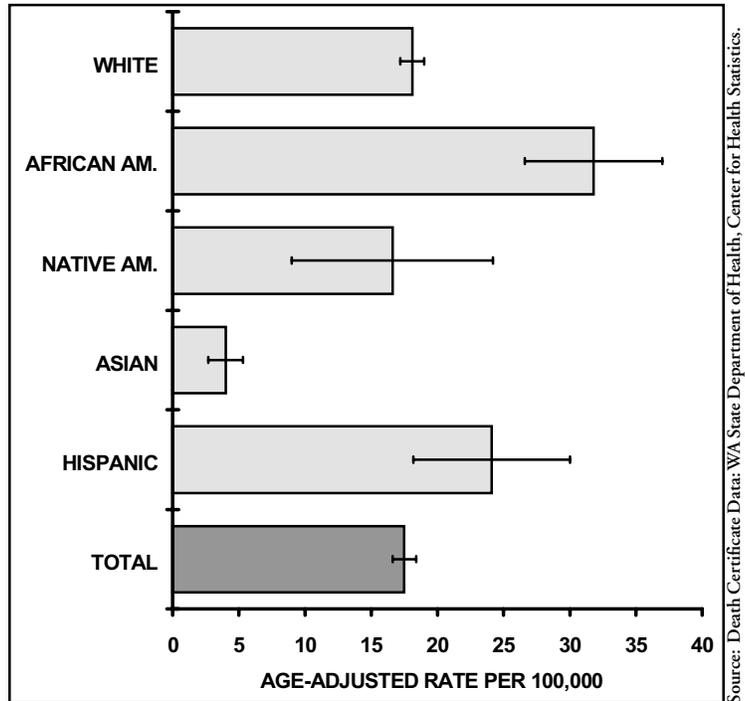
Figure 8-2:
Possible Infection Sources for AIDS Cases
King County, 1994-1996



* ALL OTHER includes hemophilia (0.5%), transfusion/transplant (0.5%), mother at risk (0.4%), and other/unknown (7.3%).

- ◆ In 1996, approximately 1,900 King County residents were living with AIDS, compared to about 1,500 in 1994, an increase of over 25% in the two-year period. A total of 6,000 to 9,000 persons in King County are estimated to be HIV infected (includes those with AIDS).
- ◆ Of the 1,537 new King County AIDS cases diagnosed in recent years (1994-96), 94% were male and 6% female. In the mid-1980s, less than 2% of cases were female.
- ◆ The majority of King County cases have occurred in men who have sex with men (MSM, 72%) and in MSM who also inject drugs (8%). In recent years (1994-96), 7% of cases have been in heterosexual drug injectors (IDU), 4% through heterosexual contact, and 9% in other categories or with undetermined risk (Figure 8-2).

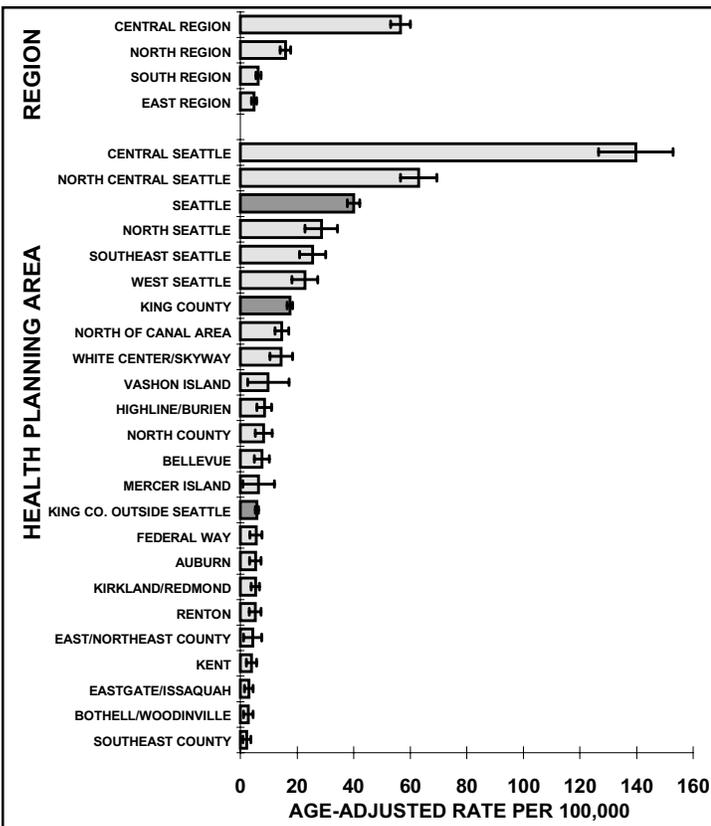
Figure 8-3:
AIDS, Age-Adjusted Death Rates
By Race/Ethnicity, King County
Five Year Average, 1992-1996



Source: Death Certificate Data: WA State Department of Health, Center for Health Statistics.

- ◆ The most common HIV infection routes for women in King County have been heterosexual contact with an HIV-infected man (about half of cases) and injection drug use (about one-third of cases).
- ◆ The AIDS death rate in King County for African Americans was significantly higher than the rate for whites, and the rate for Hispanic persons was also higher than in whites. The death rate among Asians was significantly lower than those among other races (Figure 8-3).

Figure 8-4:
AIDS, Age-Adjusted Death Rates
By Region and Health Planning Area, King County
Five Year Average, 1992-1996



Source: Death Certificate Data: WA State Department of Health, Center for Health Statistics.

- ◆ The AIDS death rate in Central Seattle was eight times that of all of King County. North Central, North, Southeast, and West Seattle also had rates higher than the overall King County rate (Figure 8-4).
- ◆ King County has the highest rates of AIDS of all Washington counties. Although King County has less than one-third of the state's population, two-thirds of the cumulative AIDS cases in Washington have been diagnosed in King County.

Prevention

Primary prevention of HIV infection, until 1994, depended entirely on health education and risk reduction approaches targeting those most at risk of infection, including MSM, IDUs, and their partners. Information about the seriousness of HIV infection and how it was transmitted was broadened to include messages to motivate and facilitate safer behaviors and coupled to the distribution of condoms and other barriers to reduce sexual transmission, and the distribution of bleach and establishment of needle exchange programs. Promotion of HIV testing among those at high risk of infection provided client-centered counseling (shown to reduce risks) to all clients, and identified HIV seropositive persons for additional case finding through partner notification, and to assist getting infected persons into care to slow disease progression and likely further reduce HIV transmission.

In 1994, the first evidence of a biomedical

prevention approach was substantiated among HIV-infected pregnant women. This involved treating pregnant women with the antiretroviral drug AZT during the last trimester of pregnancy and initial AZT treatment of the newborn, and resulted in a 66% reduction in vertical transmission. Thus, all pregnant women (and those seeking to become pregnant) should now be screened for HIV.

A later study showed that AZT also similarly reduced HIV infections in health care workers experiencing substantial exposures. Multiple studies now show that antiretroviral drugs in combination can substantially halt HIV replication, delay disease progression, and reduce the infectiousness of body fluids. Additionally, identification and biomedical treatment of sexually transmitted diseases (especially those causing ulcerations and inflammation) has been shown to greatly reduce HIV transmission, making populations at high risk for STDs ideal targets for HIV prevention.

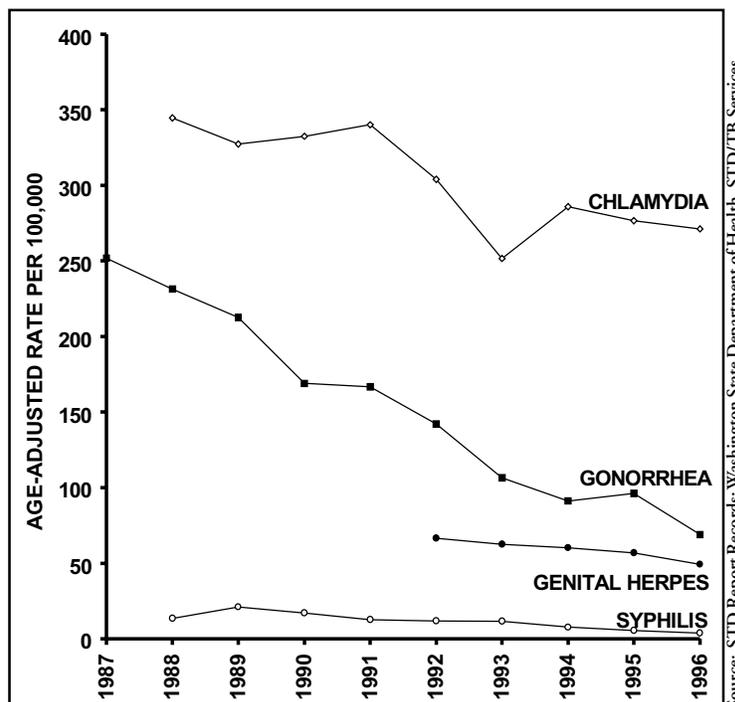
SEXUALLY TRANSMITTED DISEASES

Sexually transmitted diseases (STDs) are a common cause of serious health problems. It is estimated that over half the U.S. population acquires one or more STDs by age 30 and about 25% of the population is infected with the virus that causes genital herpes. Most STDs are much more serious in women than men; viral STDs are among the most common causes of female infertility, ectopic (tubal) pregnancy, serious infections of the newborn, and cervical cancer. The presence of STDs also increases the efficiency with which human immunodeficiency virus

(HIV, the AIDS virus) is transmitted by sexual contact. Therefore, prevention of STDs is a major control measure for HIV infection and AIDS.

Substantial declines have occurred in recent years in King County in the incidence of bacterial STDs, including syphilis, gonorrhea and chlamydial infection. Nevertheless, gonorrhea and chlamydia remain high in teenagers and young adults, in socioeconomically disadvantaged populations, and in some racial/ethnic groups.

**Figure 8-5:
STD Trends
King County, 1987-1996**



Chlamydial Infection

Infection with *Chlamydia trachomatis* is the most common bacterial STD. Chlamydial infection is the most common cause of ectopic pregnancy and female infertility due to blocked fallopian tubes. Chlamydia reporting was not started until 1988 and

comprehensive screening programs are still being expanded. Therefore, substantial underreporting remains. Moreover, screening programs primarily target women, therefore accurate statistics are not available for men.

**Figure 8-6:
Rate of Reported Chlamydia Among Females
By Age Group, King County
1996**

- ◆ Between 1988 and 1996, the incidence rate of reported chlamydial infection declined. The total number of reported female cases dropped from 3,629 in 1988 to 2,352 in 1996.
- ◆ Chlamydia is especially common in sexually active teenagers. In 1996 for females, the highest rate was observed among teens age 18-19, followed by teens age 15-17 and young adults age 20-24 (Figure 8-6).

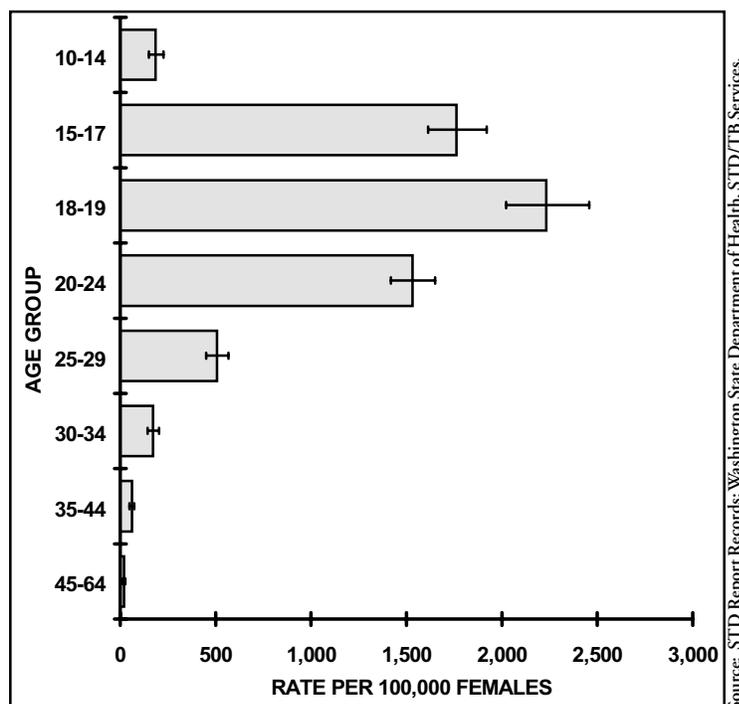
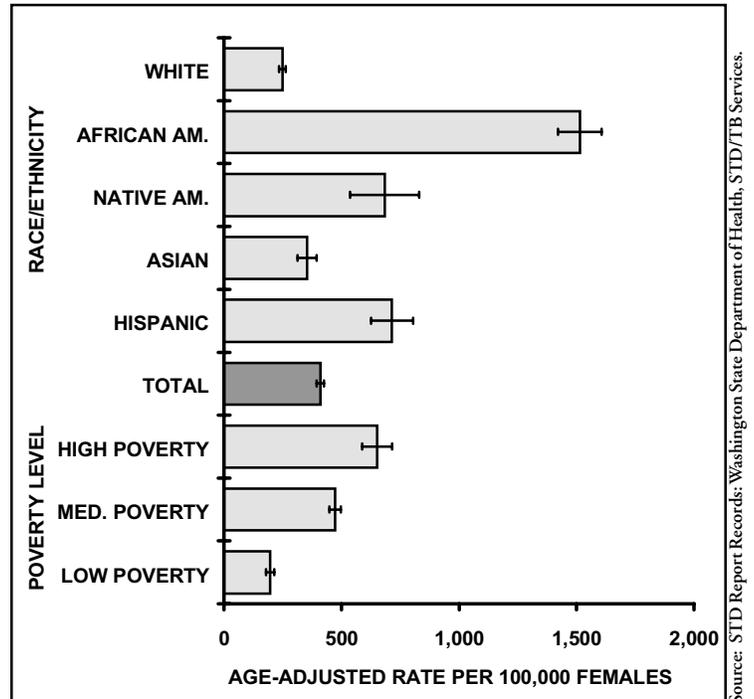


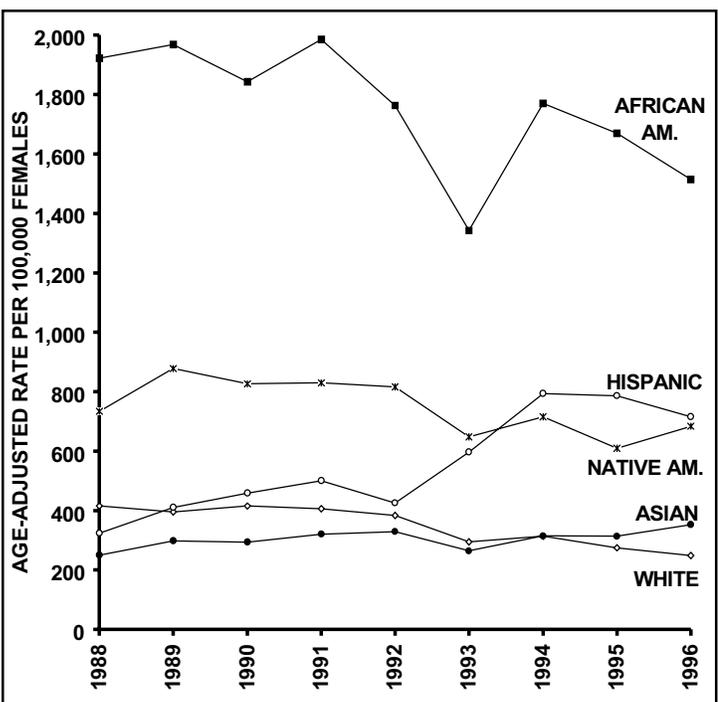
Figure 8-7:
Rate of Reported Chlamydia Among Females
By Race/Ethnicity and Residence Poverty Level
King County, 1996

- ◆ The incidence rates for minority female populations were significantly higher than the rate for whites. The age-adjusted rate was highest among African Americans, followed by Hispanics, Native Americans, Asians, and whites (Figure 8-7).
- ◆ The age-adjusted chlamydia rate for females was also significantly associated with residence poverty level.



Source: STD Report Records; Washington State Department of Health, STD/TB Services.

Figure 8-8:
Rate of Reported Chlamydia Among Females
By Race/Ethnicity
King County, 1988-1996

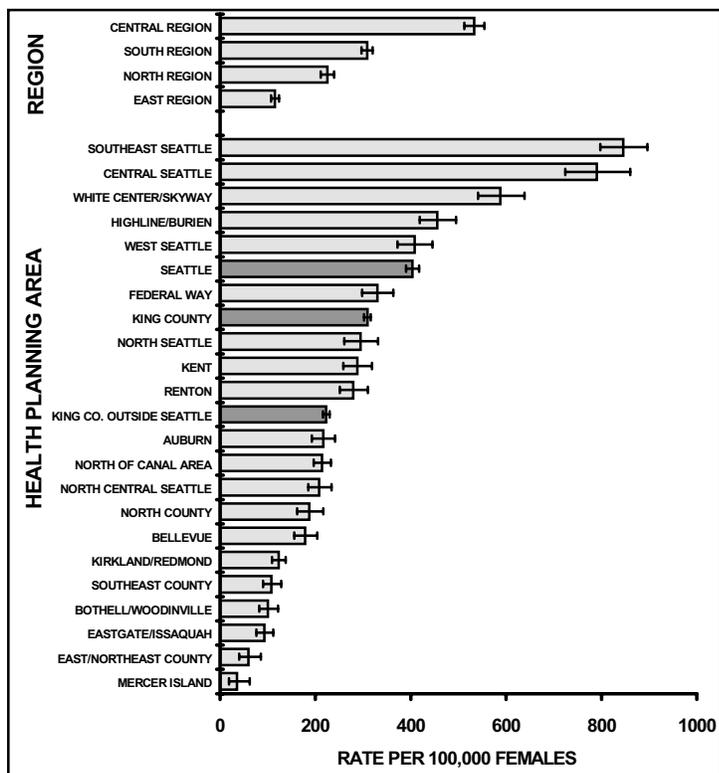


Source: STD Report Records; Washington State Department of Health, STD/TB Services.

- ◆ Between 1988 and 1996, the age-adjusted chlamydia incidence rate among females declined significantly among whites, African Americans and Native Americans but increased among Asians and Hispanics (Figure 8-8).

**Figure 8-9:
Rate of Reported Chlamydia Among Females
By Region and Health Planning Area, King County
Three Year Average, 1994-1996**

- ◆ Averaged over 1994-1996, Central Region had the highest female chlamydia rate (532.9), followed by South (308.2), North (224.9), and East (115.1) Regions.
- ◆ Among the Health Planning Areas, the rates in Southeast and Central Seattle, White Center/Skyway, Highline/Burien, and West Seattle were significantly higher than the county average. The rates in Federal Way, North Seattle, Kent, and Renton were similar to the King County rate. The rates in the remaining Health Planning Areas were significantly lower than the county average (Figure 8-9).



Source: STD Report Records: Washington State Department of Health, STD/TB Services.

Note: Vashon Island is not included because of small numbers (<10).

Gonorrhea

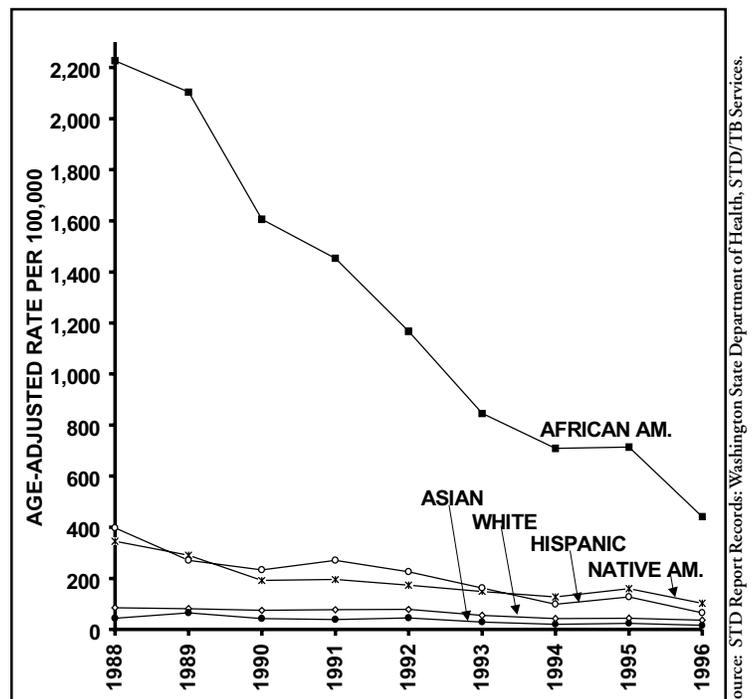
Reported cases of gonorrhea are believed to reflect about half the true total.

- ◆ The number of reported cases in 1996 in King County was 925.
- ◆ Between 1988 and 1996, the age-adjusted incidence rate of gonorrhea declined among all racial/ethnic groups in King County, especially among African Americans.
- ◆ In the late 1980s, the male rate was similar to the female rate. In recent years, however, the male rates were higher than the female rates. In 1996, the male rate was 71.3 per 100,000, compared to 42.5 per 100,000 for females.
- ◆ By age, the highest rate was observed among those age 20 to 24, followed by the 18 to 19, 25 to 29,

and 15 to 17 age groups.

- ◆ In King County 1996, the age-adjusted rate for African Americans (441.7) was 12 times the rate for whites (36.6). The rates for Native Americans (102.1) and Hispanics (65.1) were also significantly higher than the white rate. The rate for Asians (16.1) was significantly lower than the white rate.
- ◆ In 1996, the age-adjusted rate in high poverty neighborhoods (209.2) was significantly higher than the rate in medium (72.1) and low (24.2) poverty neighborhoods.
- ◆ Geographically, the highest rates were seen in Central Seattle and Southeast Seattle.

Figure 8-10:
Rate of Reported Gonorrhea
By Race/Ethnicity
King County, 1988-1996



Syphilis

The reporting system probably captures almost all diagnosed cases of early (primary and secondary) infectious syphilis. Since its peak in 1989, the incidence rate

in King County has declined sharply. The total number of reported cases declined from 235 in 1989, to 6 in 1995. There were fewer than 5 cases in 1996.

Viral STDs

Accurate statistics are not available for the viral sexually-transmitted diseases, even though many are as serious and two of them -- genital herpes and human papillomavirus infection -- are more common than all the bacterial STDs. Human papillomavirus causes genital warts and can be a cause of cervical cancer. Both genital herpes and human papillomavirus infection are present in 20 to 40 percent of women who attend family planning clinic and in 40 to 60 percent of persons attending STD clinics -- far more

common than chlamydial infection or gonorrhea. There is no cure for the viral STDs, only treatment to control symptoms.

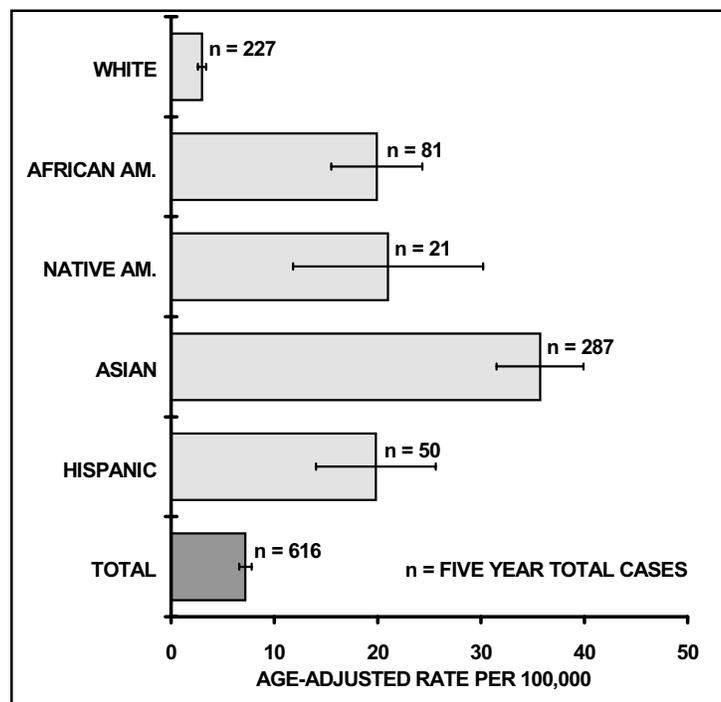
In 1996, there were 661 reported cases of genital herpes in King County. Between 1992 and 1996, the age-adjusted rate for reported genital herpes in King County declined from 66.4 to 49.3 per 100,000 population. The age-adjusted rate for females (73.5) was almost 3 times the rate for males (25.8).

TUBERCULOSIS

Tuberculosis (TB), once a major cause of illness and death, is now relatively uncommon in the U.S. Currently, a higher incidence of TB is found in three

segments of the population: immigrants from parts of the world where TB is still endemic, homeless persons, and people with HIV infection.

Figure 8-11:
Tuberculosis, Age-Adjusted Incidence Rate
By Race/Ethnicity, King County
Five Year Average, 1992-1996



Source: Tuberculosis Report Records: WA State Department of Health, STD/TB Services.

- ◆ In 1996, there were 128 new TB cases in King County. No deaths occurred among the 1996 cases.
- ◆ Between 1992 and 1996, the age-adjusted incidence rate remained stable.
- ◆ Of the 128 new cases in 1996, 45 (35%) were born in the United States, while 83 (65%) were born outside of the U.S.
- ◆ Of the foreign-born cases, Vietnam (20 cases), the Philippines (11 cases), Mexico (7 cases), and Somalia (5 cases) were the most frequent countries of origin.
- ◆ 23 cases (18%) were homeless.
- ◆ 5 cases (4%) had HIV infection.
- ◆ Averaged over 1992-1996, the age-adjusted rate among Asians was significantly higher than the rate for the other racial/ethnic groups. The rates for the minority populations were significantly higher than the rate for whites.
- ◆ The incidence rate of TB in Seattle was 6.3 times the rate for King County outside of Seattle.

HEPATITIS A

Infection from hepatitis A virus causes an acute inflammatory liver disease which is usually self-limited, and most persons recover fully. Symptoms in children are usually mild or absent; symptoms in adults include fever, nausea, abdominal discomfort and jaundice. In rare cases, hepatitis A can result in liver failure and death. Hepatitis A is spread primarily

by ingestion of the virus through fecal contaminated hands, food, or drinking water and transmission is facilitated by poor personal hygiene and poor sanitation. The occurrence of hepatitis A varies from year to year and is dependent on the degree of immunity in the population.

◆ The number of hepatitis A cases tends to fluctuate considerably from year to year. Overall, the incidence rate declined since the last epidemic that occurred between 1988 and 1990.

◆ In 1996, the incidence rate of hepatitis A in King County was 26.3 per 100,000 with 429 cases. The lowest rate (8.4) in recent years occurred in 1992, with 132 cases.

Prevention

Prevention measures for hepatitis A include vaccination of people who are at greatest risk of being exposed to hepatitis A, handwashing after toileting and before handling food, prompt investigation of disease reports, especially those involving food handlers, and administering immune globulin to those who have been exposed to hepatitis A within the previous 2 weeks. Pre-exposure administration of immune globulin is recommended for some international travelers, however shortages of this product in the last two years have prompted most travelers to get vaccinated.

The vaccine against hepatitis A was licensed in 1995 for use in the United States. It is now available for every child who is at high risk of exposure to hepatitis A at no charge through the state and national vaccine programs. Some restaurants are now vaccinating their cooking staff as a means of reducing health risks associated with improper food handling. High risk adults should be vaccinated, particularly intravenous drug users and sexually active gay males. Some people are at especially high risk for developing severe hepatitis A infections, notably chronic carriers of hepatitis B or C. They should also obtain a hepatitis A vaccination if they had not had hepatitis A in the past.

HEPATITIS B

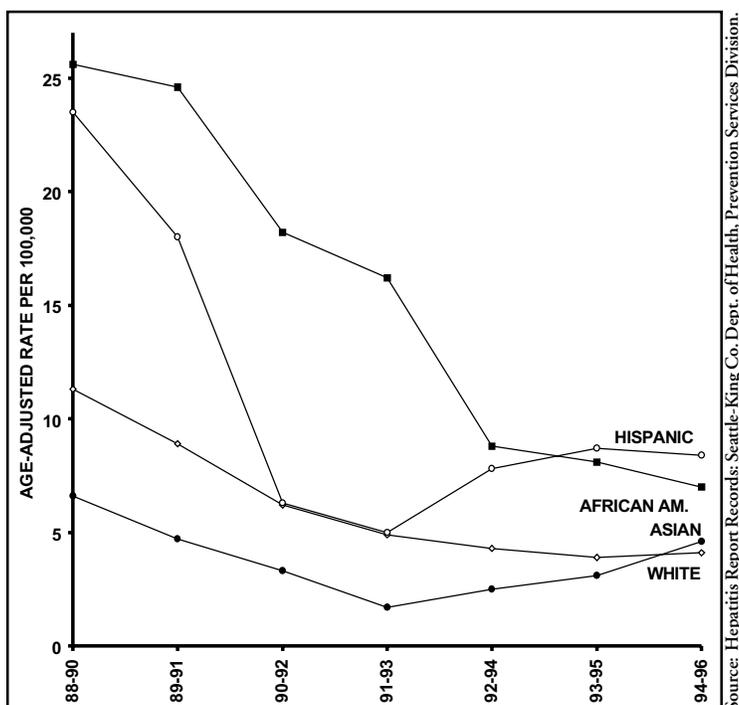
Hepatitis B is caused by infection with the hepatitis B virus (HBV). Hepatitis B is the most important cause of acute and chronic liver disease in the United States and worldwide. The risk of becoming a carrier of HBV is related to age at infection, ranging from 90% for newborns to 10% in children greater than 7 years of age and adults. Chronically infected persons (carriers) have the potential of transmitting this infection to others, and are at risk for liver cancer and other chronic liver diseases. However, chronic hepatitis B is not currently a reportable disease in Washington State. In spite of this, the Seattle-King County Department of Public

Health received 422 reports of chronic hepatitis B in 1996. Between 1992 and 1995, 517 to 632 cases were reported annually. Rates and case counts displayed in the following are of reported acute hepatitis B disease only.

HBV is transmitted by contact with blood and body fluids, either through occupational exposure to infectious materials, during sexual contact, at birth, or through the sharing of toothbrushes, razors, or needles to inject drugs. Young adults are more likely to become infected with hepatitis B than persons in other age groups.

Figure 8-12:
Acute Hepatitis B, Age-Adjusted Rates
By Race/Ethnicity, King County
Three Year Rolling Averages, 1988-1996

- ◆ In 1996, the rate of acute hepatitis B in King County was 4.9 per 100,000 population with 80 reported new cases.
- ◆ The rate of acute hepatitis B in King County declined since 1989 when the rate was 16.3 per 100,000 with 239 cases.
- ◆ Averaged over 1992-1996, the rate of acute hepatitis B among African Americans was significantly higher than the rate for whites.
- ◆ Between 1988 and 1996, the age-adjusted incidence rate of acute hepatitis B declined significantly among whites, African Americans, Native Americans, and Hispanics. The time trend was not statistically significant for Asians (Figure 8-12).



Note: Because of small numbers, the time trend for Native Americans is not shown.

Prevention

In 1996, 121 infants were born in King County to mothers who were chronic carriers of hepatitis B. The Seattle-King County Department of Public Health worked with the families and health care providers of these infants to assure that the infants received their hepatitis B vaccinations on time. Without vaccination, up to 90% of these infants can be infected and become themselves chronic carriers. One in four of infants infected will eventually die of liver disease. Vaccination reduces the risk of infection to less than 5%.

There is a highly effective vaccination against hepatitis B. Children from birth to age 18 can obtain the three-dose vaccination series at no cost through the national childhood vaccine distribution program.

High risk adults should also be immunized. High risk adults include those who have occupational risk of exposure to blood, people who reside in institutions for developmentally disabled, hemodialysis patients, sexually active homosexual and bisexual men, people who inject drugs, people who frequently receive blood products as a treatment for another disease, sexually active heterosexuals who have had more than one sexual partner in the previous 6 months, inmates of long-term correctional facilities, household contacts and sexual partners of chronic carriers of hepatitis B, persons who are from areas of the world in which hepatitis B is more prevalent, and international travelers who plan to reside for more than 6 months in areas with high prevalence of hepatitis B infection.

HEPATITIS C

The hepatitis C virus is passed when blood infected with the virus gets into the bloodstream of another person. Hepatitis C is an emerging health concern in King County. Although the disease itself is not new, blood testing that has been available since 1990 is detecting growing numbers of chronically-infected persons. For example, in a study of intravenous drug users in King County, the prevalence rate of hepatitis C was 80 to 85%.

Most acute hepatitis C infections go unrecognized because the initial symptoms are often mild. Unlike hepatitis A, in which none of the people acutely infected become chronically carriers, it is thought that up to 85 percent of the people infected with hepatitis C virus become carriers. Carriers are

more likely to develop subsequent liver disease. Hepatitis C is now the main cause of liver failure and liver transplant in the United States.

In 1996, 11 *acute* cases and 611 *chronic* cases of hepatitis C were reported. Once diagnosed, there are few treatment options available, and there is no vaccination that can prevent this infection from developing. Prevention of this disease includes testing donated blood for Hepatitis C antibody, and avoiding contact with blood or objects that have blood on them. People who have Hepatitis C antibody are now recommended to obtain vaccinations against Hepatitis A and B, if they have not yet had these diseases, to reduce the risk of developing severe liver disease and death.

VACCINE PREVENTABLE DISEASES

In addition to hepatitis B, a number of other diseases are preventable by vaccination. In the United States, children are routinely targeted to receive vaccinations for the following nine diseases by their second birthday: diphtheria, tetanus, and pertussis (DTP); measles, mumps, and rubella (MMR); hemophilus influenza type b (Hib), hepatitis B, and poliomyelitis. The Washington State immunization law requires that all children be fully immunized at school entry. A two year old is considered current for the recommended basic immunizations if the child has had four DTP, three polio, one MMR, and three HBV immunizations,

plus one age appropriate series of Hib vaccine.

The National Immunization Survey estimated the vaccination coverage rates with the 4:3:1 series¹ and 4:3:1:3 series² among children aged 19 to 35 months for 1996.³ For King County, the rates were 82% and 81% respectively, compared to 79% and 78% in Washington State, and 78% and 77% in the United States. The rate of vaccination for 4:3:1 series in King County increased from 78% during April 1994 to March 1995, to 86% during June 1996 to July 1997. The rate at 86% was the highest among the 27 largest urban areas in the United States.

Table 8-2:
Hib, Measles and Pertussis, Rate Per 10,000 Population
King County, 1988-1996

| Year | Hib | | Measles | | Pertussis | |
|------|------|--------|---------|--------|-----------|--------|
| | Rate | Number | Rate | Number | Rate | Number |
| 1988 | 4.1 | 59 | 0.0 | 0 | 1.0 | 15 |
| 1989 | 2.1 | 30 | 0.3 | 5 | 2.1 | 31 |
| 1990 | 2.6 | 39 | 2.9 | 44 | 4.0 | 60 |
| 1991 | 0.9 | 14 | 0.6 | 10 | 1.8 | 27 |
| 1992 | 0.5 | 8 | 0.3 | 5 | 2.4 | 38 |
| 1993 | 0.4 | 6 | 0.0 | 0 | 1.4 | 22 |
| 1994 | * | 3 | * | 1 | 3.0 | 48 |
| 1995 | * | 3 | * | 4 | 15.6 | 251 |
| 1996 | 0.3 | 5 | * | 4 | 16.1 | 263 |

* A rate is not calculated if the number of cases is less than five.

Source: Vaccine-Preventable Report Records: Seattle-King County
Dept. of Health, Prevention Services Division.

- 1 Four doses of diphtheria and tetanus toxoids and pertussis vaccine/Diphtheria and tetanus toxoids (DTP/DT), three doses of poliovirus vaccine, and one dose of measles-mumps-rubella vaccine (MMR).
- 2 Four doses of DTP/DT, three doses of poliovirus vaccine, one dose of MMR, and three doses of Haemophilus influenzae type b vaccine.
- 3 CDC. Status Report on the Childhood Immunization Initiative: National, State, and Urban Area Vaccination Coverage Levels Among Children Aged 19-35 months - United States, 1996. MMWR. July 25, 1997. 46(29): 657-664.

A vaccine against Hib was licensed in 1985 for children 24 months of age or older. In 1987, a Hib conjugate vaccine was licensed for use in children 15 months of age or older, and in late 1990 two conjugate vaccines were licensed for children as young as 2 months of age. Widespread use of these vaccines has markedly decreased the incidence of invasive Hib disease in young children. The large number of measles cases in 1990 was due to a nationwide epidemic which affected Washington state, including King County. Pertussis (whooping cough) continues to occur in unimmunized children and immunized individuals with waning immunity.

Pertussis is an acute bacterial upper respiratory infection caused by *Bordetella pertussis*. Since introduction of pertussis vaccine in the 1940's, the incidence of pertussis decreased dramatically. Pertussis has been perceived as a disease of children under five years of age. Recently the incidence of pertussis has begun to climb. In 1995, the rate of pertussis in King County rose suddenly from 2-4 cases per 100,000 to 15.6 cases per 100,000. This increased

number of reported cases continued through 1996. Follow-up of all reported cases by the Seattle King County Department of Public Health revealed that many other people were coughing in the homes and social groups of each person who tested positive. Adults and fully immunized children can also get pertussis if they are exposed to someone who has the disease. This is because the immunity a person gets from either having pertussis disease or from receiving immunization to pertussis wears off as time passes. In fact, the majority of cases in the community were over the age of five years. Adults and school-aged children are often source of disease for infants but may not be reported until an infant case is diagnosed.

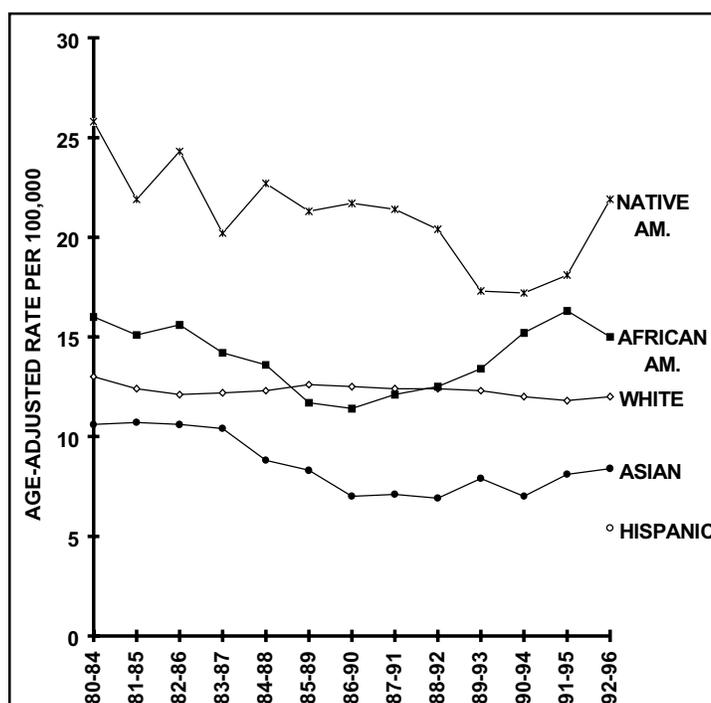
Immunization for pertussis is given to infants and young children who are the most likely to become seriously ill and require hospitalization for pertussis. A new type of "acellular vaccine" (DtaP) which has fewer side effects than the old DTP vaccine is now available for all five of the pertussis immunizations that children receive before their seventh birthday.

PNEUMONIA AND INFLUENZA

Pneumonia and influenza are the leading causes of death from infectious diseases. Like diabetes, they often occur in persons with other health problems and are often listed as a contributing cause of death rather than the underlying cause. They are also

among the leading causes of hospitalization among children and the elderly. The risk factors of pneumonia and influenza include smoking, alcoholism, advanced age, chronic heart, lung, and kidney diseases, and diabetes.

Figure 8-13:
Pneumonia and Influenza, Age-Adjusted Death Rates
By Race/Ethnicity, King County
Five Year Rolling Averages, 1980-1996

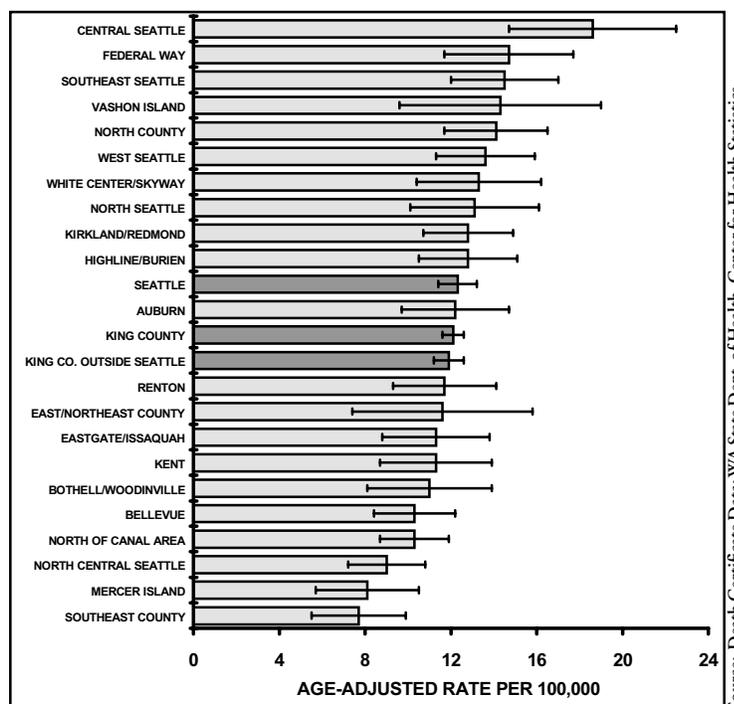


Source: Death Certificate Data: WA State Dept. of Health, Center for Health Statistics.

- ◆ In 1996, the age-adjusted death rate per 100,000 population was 12.1 in King County and 11.4 in Seattle with 470 and 204 deaths respectively.
- ◆ Pneumonia and influenza are also associated with many other deaths as the contributing cause. In 1996, there were a total of 1,104 deaths in which pneumonia or influenza was either the underlying cause or the contributing cause.
- ◆ Between 1980 and 1996, except for a relatively higher rate in 1980 (16.2), the age-adjusted death rate for pneumonia and influenza stayed stable in King County.
- ◆ Among the elderly, the death rate increases with age. Averaged over 1992-1996, elderly age 85 and older accounted for 52% of the deaths from pneumonia and influenza, the 75-84 age group accounted for 30%, and the 65-74 age group 11%. Adults age 65 and older accounted for 93% of the deaths.
- ◆ Averaged over 1992-1996, the age-adjusted death rate for Native Americans was significantly higher than the rate for whites. The rates for Asians and Hispanics were significantly lower than the white rate (Figure 8-13).

**Figure 8-14:
Pneumonia and Influenza, Age-Adjusted Death Rates
By Health Planning Area, King County
Five Year Average, 1992-1996**

- ◆ Geographically, there were no significant differences in the age-adjusted death rates among the health regions. By Health Planning Area, the age-adjusted rate for Central Seattle was significantly higher than the county average rate (Figure 8-14).



Source: Death Certificate Data: WA State Dept. of Health, Center for Health Statistics.

Prevention

The most common types of bacterial pneumonia and viral influenza are often preventable through immunization. Studies show that vaccination significantly reduces the rates of hospitalization for pneumonia and influenza as well as for other acute and chronic respiratory conditions and congestive heart failure⁴. It is recommended that persons age 65 and older and high risk individuals should receive annual

influenza vaccination as well as at least one pneumococcal vaccine.

The 1997 Behavioral Risk Factor Survey data showed that among elderly age 65 and older in King County, 72% had received influenza vaccination during the previous twelve months and 44% had ever received a pneumococcal pneumonia vaccination.

⁴ Nichol, KL et al. (1994): The Efficacy and Cost Effectiveness of Vaccination Against Influenza Among Elderly Persons Living in the Community. The New England Journal of Medicine. September 22, 1994. 331(12): 778-784.

ENTERIC DISEASES

The most common and serious enteric diseases include campylobacteriosis, E. coli O157:H7, salmonellosis, giardiasis, shigellosis, and hepatitis A. Foodborne bacterial diseases of animal origin, such as campylobacteriosis, salmonellosis, and E. coli O157:H7, can be prevented by adequate cooking, keeping foods at a safe temperature, cleaning utensils well, and good hand washing. Child care settings, particularly those which care for children who wear diapers,

are susceptible to outbreaks of intestinal diseases. Careful attention to hygiene, including hand-washing, sanitizing toys and diaper changing areas, and exclusion of children with diarrhea symptoms, will prevent such outbreaks.

Since 1988, the rates of campylobacteriosis, salmonellosis and giardiasis in King County have been relatively stable, except the epidemics of shigellosis and E. coli O157:H7 in 1993.

Table 8-3:
Enteric Diseases, Rate Per 10,000 Population
King County
1988-1996

| Year | E. Coli O157:H7 | | Shigellosis | | Campylobacteriosis | | Salmonellosis | | Giardiasis | |
|------|-----------------|--------|-------------|--------|--------------------|--------|---------------|--------|------------|--------|
| | Rate | Number | Rate | Number | Rate | Number | Rate | Number | Rate | Number |
| 1988 | 3.8 | 55 | 8.8 | 126 | 21.8 | 311 | 15.5 | 222 | 15.7 | 224 |
| 1989 | 3.7 | 54 | 5.5 | 81 | 29.7 | 435 | 18.0 | 263 | 16.2 | 237 |
| 1990 | 4.4 | 66 | 6.4 | 96 | 29.5 | 445 | 18.8 | 284 | 19.2 | 289 |
| 1991 | 2.7 | 41 | 5.3 | 82 | 28.7 | 443 | 17.8 | 275 | 16.0 | 246 |
| 1992 | 6.6 | 104 | 8.2 | 129 | 29.3 | 458 | 15.3 | 240 | 13.6 | 213 |
| 1993 | 20.4 | 324 | 19.7 | 312 | 25.8 | 410 | 18.7 | 297 | 14.2 | 226 |
| 1994 | 3.8 | 61 | 6.8 | 109 | 19.0 | 304 | 15.1 | 242 | 13.4 | 215 |
| 1995 | 2.6 | 42 | 9.7 | 156 | 20.4 | 329 | 15.6 | 252 | 15.6 | 250 |
| 1996 | 3.6 | 59 | 4.3 | 70 | 20.9 | 340 | 13.7 | 223 | 15.2 | 247 |

* Rate per 100,000 population.

Source: Enteric Disease Report Records: Seattle-King County Department of Health, Prevention Services Division.

E. coli O157:H7

In November 1994, the SKCDPH studied an outbreak of *E. coli* O157:H7. During that outbreak we utilized a DNA fingerprinting method which permitted an early recognition that a common source was involved. Epidemiologic investigation showed that the source was a commercial pre-sliced salami product. The same strain was recovered from the salami product, establishing the source. Subsequent investigation by the U.S. Department of Agriculture implicated the freeze drying process, which has since been modified for the entire industry.

Since that episode, the SKCDPH has utilized DNA fingerprinting methodology routinely on all isolates of *E. coli* O157:H7.

During 1996 this methodology permitted the early recognition of another outbreak with a common source. In October 1996, on the basis of 10 cases of

disease, SKCDPH was able to pinpoint a particular brand of unpasteurized apple juice as a source. This was reported to the FDA and the CDC, and subsequently 70 cases of confirmed disease in three states and British Columbia were identified, with many more presumptive cases. The FDA recovered the organism from an apple juice specimen collected in Seattle and it was shown by DNA fingerprinting to be identical to the strains that had caused the human disease. As a result of this outbreak, the FDA has introduced clearer labeling of pasteurization. The firm that produced the apple juice in this instance decided to pasteurize their apple juice, although that has not happened throughout the industry.

Outside of the outbreaks, the majority of the disease that occurs is due to sporadic contamination, most often of meat products and predominantly from ground beef.

Shigellosis

Shigellosis is spread by the fecal-oral route or indirectly through contaminated food. *Shigella* species are highly infectious, and transmission is predominantly from person to person rather than through a food vehicle. For this reason, health department recommendations regarding exclusion of infected persons from child care programs, foodhandling, and patient care along with education regarding the importance of handwashing and hygiene

are the most effective means of preventing transmission.

In 1993, the number of reported shigellosis infections increased sharply to 312 for a crude rate of 19.7 per 100,000. An epidemic of shigellosis began in late 1992 and lasted a period of eleven months. Case numbers since then have dropped back to routine levels, with 70 cases reported in 1996.

Campylobacteriosis

Campylobacteriosis, in most years the most commonly reported bacterial cause of intestinal illness, is an infection which is usually transmitted through food, particularly undercooked poultry.

Other sources of Campylobacter infection include unpasteurized milk, infected animals and infected persons. In 1996, a total of 340 cases in King County were reported.

Salmonellosis

Salmonellosis is similar to campylobacteriosis with regard to symptoms and pattern of occurrence. Salmonella infection usually results from eating contaminated food but can be contracted from an infected person or animal through contact with their feces. Infected food handlers can be sources of outbreaks. Poultry, meat and eggs are the most

common source of infection but almost any type of food can be contaminated with Salmonella. In 1996, 223 cases in King County were reported. The salmonellosis rates had a different geographic distribution than for campylobacteriosis, with significantly higher rates in Southeast Seattle than for the county as a whole.

Giardiasis

Giardiasis is a parasitic infection which causes symptoms of diarrhea, stomach cramps, and nausea. It is caused by the protozoan *Giardia lamblia* and is commonly reported in King County. Two major sources of this infection in King County continue to be contaminated water and children in day care

centers. Water can become contaminated when wild or domestic mammals defecate into rivers, lakes or streams. Recreational water can become contaminated when infected persons, most often diapered children, defecate into the water. A total of 247 cases in King County were reported in 1996.
